

EUROPEAN SOFTWARE AND SERVICES MARKET

1991-1996

DISTRIBUTION SECTOR

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1991-1996

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Market Analysis Programme - Europe

European Software and Services Market

1991-1996

Distribution Sector

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Abstract

This report analyses the software and services market in the distribution industries of Western Europe and its growth potential over the period 1991 to 1996. A commentary is included on the emergence of "electronic commerce" during the 1990's.

The report provides market size estimates for 1990 and forecasts from 1991 to 1996 for the software and services market analysed into its component sub-sectors or delivery modes. Only services business specific to the sector is counted so that cross-industry products and services are excluded. The sectors covered are processing services, turnkey systems, applications software products, professional services, network services, systems integration and systems operations. These forecasts are provided for Western Europe as a whole and for France , Germany, the U.K., Italy and Spain.

Leading vendors are compared. Key user concerns and trends are discussed. The main issues and opportunities for vendors are identified. •

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III EDI and Electronic Commerce

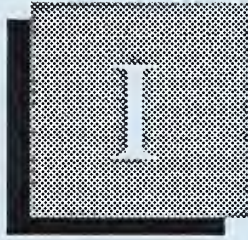
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Introduction



I Introduction

A Objectives

This report has been produced as part of INPUT's Western European Market Analysis Programme for the computer software and services industry. The objective of the report is to provide a market assessment for the distribution (retail and wholesale) sector in Western Europe. The report contains material updated from last year's report and should be read in conjunction with that report. This assessment includes:

- An analysis of the overall size of the market and its sub-sectors.
- A forecast for market growth for the period 1991 - 1996.
- An analysis of the leading vendors active in this market sector.
- A commentary on major forces shaping the market and the resulting implications for vendors.

B Scope

This report reviews the software and services market for the distribution sector of Western Europe for the period 1990 to 1995.

Boundaries are blurring between retail and wholesale activities as retailing becomes more and more concentrated in large companies. The report covers software and services demand generated by distribution companies seeking better control of costs, faster movement of goods and improvements in customer service.

The distribution sector is defined as the wholesaling and retailing of products, including food, merchandise, automotive and hospitality. The market is identified by SIC codes 5000 to 5999 inclusive. It excludes physical transport of goods where ownership is not transferred to the shipper, and the financial services supporting trade. For example EFTPOS (Electronic Funds Transfer at Point of Sale) networks operated by the banks are covered in a separate INPUT report in the 1990 Market Analysis Programme-Europe. Manufacturers' warehousing software and services are included in INPUT sector reports on the process manufacturing and discrete manufacturing markets.

Geographically the study analyses and forecasts the following country markets:

- France
- Germany
- United Kingdom
- Italy
- Spain

In looking at this industry sector, only business specific to the sector is counted, so that cross-industry products and services are excluded from the forecasts. The detailed analysis includes the following major categories: (Definitions are given in Appendix A)

- Processing services
- Network services
- Applications software specific to this sector
- Professional services
- Turnkey systems
- Systems integration

Omitted from the analyses are the user spends on:

- Systems software such as operating systems, databases, languages and development tools
- Related professional services including product training and technical consultancy
- Generic network services and on-line databases
- Cross-industry processing services such as transaction services
- Cross-industry applications such as accounting systems and office automation software products

C **Methodology**

The research that contributed to this study was derived from the following sources:

- INPUT's on-going research of the Western European software and services market which includes the collection of revenue and product information from over 400 vendors annually.
- Interviews with senior managers from both independent software product and service vendors and equipment vendors.
- The use of INPUT's extensive library facilities which include vendor literature and press releases as well as trade press, newspaper and magazine articles and previous INPUT reports relevant to the system software products market sector.

D

Report Structure

The remaining chapters of this report are organised as follows:

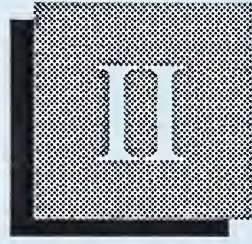
- Chapter II contains an executive overview of the key factors shaping this market.
- Chapter III examines the emergence of electronic commerce as a new mode of doing business which is expected to radically alter the distribution supply chain.
- Chapter IV sets out INPUT's estimates and forecasts of user expenditures on software and services and the relevant revenues of leading vendors. These forecasts are broken down by country market and by delivery mode.
- The Appendix contains the forecast database, a consolidation between last year's forecast and this year's, and a glossary of EDI terms.

E

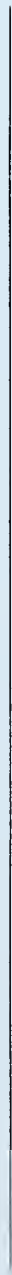
Related INPUT Reports

Readers may find it useful to refer to other INPUT reports which relate to the findings of this report:

- Overall Western European market reviews:
 - The Western European Market for Computer Software and Services, Forecast and Analysis, 1989-1994 (December 1989)
 - The Challenge of the Single European Market -1992 and Beyond (December 1989)
- Industry sector reviews:
 - European Software and Services Market, 1990-1995-Banking and Finance Sector (see details on EFTPOS)
 - U.S. Industry Sector Markets, 1989-1994 -Retail Distribution Forecast Update
 - U.S. Industry Sector Markets, 1989-1994 -Wholesale Distribution Forecast Update
- Network services reviews:
 - EDI Intertrends -Western Europe, 1989-1994
 - International EDI Services



Executive Overview



II Executive Overview

A Outlook - Recession and Downsizing Lower Growth Expectations

Deepening recession in most European markets means that achieving savings through faster product movement is still the top priority driving investment in information systems and services for European distribution businesses. INPUT forecasts that overall, the market for industry-specific software and services in retail and wholesale distribution in Western Europe will reach \$4.1 billion in 1991, growing to \$7.1 billion by 1996.

Exhibit II-1 lists some of the key trends moulding the market. Changing business practices and the use of scanning EPOS (Electronic Point of Sale) terminals create demand for new applications and wider systems integration. As competition among retailers and wholesalers increases, so does demand for high-function application packages to replace in-house developments. To fully exploit the mountains of sales data being generated and speed the flow of information and products, companies are networking and integrating their systems and traders are looking to share more information both internally and with customers and suppliers - a phenomenon INPUT calls Electronic Commerce, which is fully described in Chapter III.

By using information systems to help reduce lead times and inventory costs - still the biggest contributors to better profits - the market leading retailers are raising consumer expectations for speed and quality of service. Consumer preference is now fueling demand for such improvements across the whole industry. At the same time, both retailers and wholesalers, already suffering with staff shortages, are faced with a shrinking labour pool. On top of that, transport and space costs are both expected to increase rapidly over the next few years.

Exhibit II-1**Key Distribution Industry Trends
Software and Services
Western Europe**

- Electronic commerce favoured
- Retailers by-pass wholesalers
- Downsizing limits IS spend
- Manufacturers lead market

The information systems now in the hands of some major retailers is enabling them to push much of the risk in following consumer preference back to the wholesalers and manufacturers. Just-in-time (JIT) techniques applied by retailers are reducing stock levels and increasing stock-turns and forcing suppliers to take more of the risks in predicting demand and holding stocks. The value added by some wholesaling agents is reducing as EDI systems gain wider acceptance, retailers are by-passing wholesalers in some cases.

The trend to downsize, to move applications onto smaller lower-cost hardware and to buy application packages, is still dominant right across Europe. The effect is that users can buy more IS solutions even though they are restricting their budgets under the pressure of recession. For vendors it means that competition is becoming more intense and prices are being held down. In the retail sector especially the market leaders are (and will remain) the suppliers of leading edge hardware such as scanners, and software and services play a supporting role. For wholesalers the software is the more key technology in achieving competitive edge. Exhibit II-2 shows the forecasts for each of these subsectors.

Trade barriers are set to fall around Europe, and distributors are implementing data links crossing national boundaries to both suppliers and customers. This is leading to significant cross-border investment and pan-European alliances. The result is demand for more expansive information systems and networks, with a fast growing number of major systems integration projects under consideration. The successful management of the large-scale complexities of these projects offers vendors potential for both high reward and high risk. Users are looking for vendors with a strong successful track record both in the distribution industry and in major projects.

There are large differences among European countries in the structure of their local distribution markets. This leads to very different demands for solutions. Overall, it is the retailers who are becoming the driving force in stepping up the pace of business, as the spread of EPOS systems begins to generate a mass of immediate consumer preference data. Those distribution companies that can manage this data and convert it into valuable market information and business knowledge will gain the winning competitive edge.

B
Overall Market Forecasts

INPUT estimates that the industry specific computer software and services market in Distribution for Western Europe was \$3.7 billion in 1990. As Exhibits II-2 and II-3 illustrate, the overall market is expected to grow from \$4.1 billion in 1991 to \$7.1 billion in 1996, despite the current short term recession fears in the industry.

This forecast represents a compound annual growth rate (CAGR) of 12%, which includes the predicted effects of inflation country by country around Europe - see Appendix E for assumptions. This compares to a forecast of 15% for the whole European market for software and services.

Exhibit II-2
Software and Services Market
Retail and Wholesale, Western Europe

| | \$ Billions | | |
|-----------|-------------|-----------------------------------|------|
| SUBSECTOR | 1991 | 1991 1996 CAGR (PERCENT) | 1996 |
| Retail | 1.7 | 16 | 3.5 |
| Wholesale | 2.4 | 8 | 3.6 |
| TOTAL | 4.1 | 12 | 7.1 |

Exhibit II-3

Software and Services Market
Distribution, Western Europe

| | \$ Billions | | |
|-----------------------|-------------|-----------------------------------|------|
| SUBSECTOR | 1991 | 1991 1996 CAGR (PERCENT) | 1996 |
| Processing Services | 0.3 | -1 | 0.3 |
| Turnkey Systems | 1.2 | 10 | 2.0 |
| Applications Software | 0.5 | 16 | 1.1 |
| Professional Services | 1.3 | 10 | 2.1 |
| Network Services | 0.4 | 17 | 0.9 |
| Systems Operations | 0.1 | 16 | 0.2 |
| Systems Integration | 0.3 | 19 | 0.7 |
| TOTAL | 4.1 | 12 | 7.1 |

As in many other industries, the information systems revolution is fueling a business revolution both in the supply chain and at the check-out counter. Cause and effect are difficult to separate. New information management techniques are paralleled by new working practices for the distributive trades.

The wholesale sector is the larger in Europe overall, but retail investment is growing faster to eliminate the gap over the next five years. Driving this growth are a whole range of factors, all of which impact directly on the European software and services industry. The use of processing services is giving way to wider use of the international networks and the contracting out of internal operations as systems operations contracts. In-house applications have been the norm in this sector for many years. Many users can no longer afford such self-sufficiency in order to gain some competitive edge with their information systems. They are being attracted to application packages that are easily tailored and are highly functional.

As applications become distributed onto smaller hardware platforms, so they have become more complex from a whole enterprise viewpoint. Instead of looking to vendors for the traditional technical support on their products, the users are now seeking business support and consultancy. User training has become a major issue as the part-time and casual labour force has grown in this sector. The most common consumer complaint about retailers is that there is a real shortage of knowledgeable and skilled sales staff. This reflects both the high turnover of part-time staff and the growing need for specialist skills in operating cash tills or doing stock checks.

Where there used to be an emphasis on implementing centralised integrated business systems, there is now a growing demand to move information across departmental and company boundaries and across systems from a variety of vendors. The main benefit of shortening these communication paths is the faster movement of stock, reducing the investment in product, space and staff wherever possible.

Network applications are key to the emergence of pan-European retailers and purchasing consortia such as the alliance between Casino of France, Ahold of the Netherlands, Argyl of the U.K. and La Rinascente of Italy. They are also key to the shortening of the supply chain through the use of EDI (Electronic Document Interchange). In fact, EDI services are set to grow at two or three times the rate of the overall network services market over this period. However, for the retail sector, achieving this rate of growth will require some large companies to lay down the law to their suppliers-rather like Sears Roebuck has in the U.S., where it set a two-year deadline for its 7,000 suppliers to adopt national industry standards for EDI communications.

The major networking vendors all offer services specific to the distribution sector, indicating the level of commitment they have to this sector. There is a growing recognition that although networks are vital to the running of any large business, there are sound financial reasons for contracting out the supply of the services, rather than managing the whole network with in-house resources. For example, WH Smiths has contracted Digital to supply its national network in the U.K., a move away from in-house network management.

Applications software products represent a major opportunity in the distribution sector. The turnkey systems market includes the applications products which are supplied packaged up with hardware and professional services. The most visible trends in this solutions sector are the downsizing of packages - re-engineering them onto smaller/cheaper platforms - and the new cooperation among vendors as each tries to remain highly specialised rather than tackle every customer requirement single-handedly. There is still great potential for new application products which:

- Can be easily tailored-without programming
- Meet the wider integration needs of the European businesses
- Exploit the latest hardware and software platforms and
- Give a fast pay-back on the client's investment

There is a strong move to buying-in applications based on packages, rather than developing them in-house or contracting for their development. This is changing the profile of the turnkey systems suppliers - for example Siemens Nixdorf. As such vendors offer functionally richer application packages, so they are reducing the level of custom development undertaken. Instead, this is becoming a system configuration exercise, and they can give more attention to helping the customer implement the system with consultancy and training. At this level there is also change. Clients are now far more willing to change their organisation to match the new working practices implied by application packages. For example, in areas like DRP (Distribution Resource Planning), previously discrete functions like purchasing and transport management are treated as related parts of a total logistics problem.

The professional services market is second in size only to turnkey systems in the distribution sector (see Exhibit II-3). The trend to contract out continues, but with a change of emphasis. The growing demand for custom software and technical support will slow somewhat, but this will be compensated for by growth in consultancy, education and training.

IBM is well positioned to retain its market lead in the distribution sector. It is the platform of choice for more than half the hardware revenues in the sector. It is the software and services leader in all major countries. It has already taken minority interests in distribution sector application software companies, and continues to strengthen a myriad of other partnerships. It offers EDI and other networking services and has defined a retail version of SAA, its systems applications architecture. And it is taking systems integration very seriously indeed, as its proprietary hardware hold on the market continues to be eroded by PCM and open systems vendors.

Germany, France and the United Kingdom continue to dominate the European market with roughly 25% each. This picture tends to hide the wide differences in national infrastructures. France's retail sector is largely still in the hands of private families, and now boasts 800 hypermarkets. Germany has eight of the top 20 European distribution companies. In the U.K. the retail sector is dominated by large chains and is bigger than the wholesale sector. Italy, despite consumer retail spending being as high as in Germany, is still a country of the small business and as a result is late in exploiting software and services.

Exhibit II-4 gives a different perspective on the ranking by comparing IS investment with retailer revenues. This gives a relative measure of how much of the retailer revenue is going into distribution sector information systems in each country. U.K. retailers hold a lead position in their level of investment in IS. U.K. retailers are also the envy of other European countries, and the USA, in terms of their profit performance. INPUT expects the retail revolution already underway in the U.K. to be repeated in the rest of Europe over the next five years.

Exhibit II-4

Software and Services Expenditure as
Percent of Retail Company Revenues

| Country | Percent |
|----------------|---------|
| United Kingdom | 0.40 |
| France | 0.30 |
| Germany | 0.25 |
| Italy | 0.10 |

C
Market Development

Four technologies can be seen as powerful catalysts for change in the distribution sector:

- Bar coding - Article Numbering Standards and Labels
- EDI (Electronic Document Interchange)
- EFTPOS (Electronic Funds Transfer at the Point of Sale)
- Image - Document Image Processing and Video

Scanning check-out EPOS (Electronic Point of Sale) terminals are already familiar to many shoppers. They have an inherent ability to generate masses of consumer and product data for retailers. Little of this data is yet available to retail managers or their suppliers to aid the smooth development and running of the business. This data explosion is likely to occur further back in the supply chain as bar coding is adopted to mark containers rather than just consumer products. EDI promises to change the way distribution companies do business, and the way their staff work. As information is shared along the supply chain, new economies and improvements will require management to re-think the traditional roles of buying, selling, delivering and inventory management. EFTPOS electronic payment systems are going through similar revolutionary changes. But country differences are large, as national banks more or less choose their own paces and techniques for cutting down on paper transactions.

Image processing is a rapidly emerging area of new activity. It is particularly relevant to distribution companies in document storage and retrieval, and in on-line sales catalogues. The storage of "proof of delivery" documents is now economically handled electronically, removing yet more paper from the trader's administrative workload. On-line or on-disk product catalogues with pictures of the goods may give a fresh boost to home shopping and the small shopkeeper.

With all the activity surrounding these new technologies in supply chain systems, it is easy to be misled into thinking that the industry is well down the development path. INPUT's analysis follows the five-stage evolution of systems in both large and small distribution organisations.

It starts with the most fundamental uses of IS in business automation-the capture of operational information in various departments or sites around a company:

- *Stage 1 Automation:* Generally this stage generates records of (past) activity within an area such as sales, deliveries, stocks, or accounts. The large majority of small and medium-sized businesses are either at or have not even reached this stage of development.
- *Stage 2 Integration:* This may merely be the networking of several systems, or it may involve replacing some applications or databases to allow access among departments. This stage is often a move to regain centralised control of information flow.
- *Stage 3 Delegation:* Having centralised, the next step is to decentralise and provide local management with more decision support and autonomy. At this stage, companies are feeling they are properly managing their internal flow of information.
- *Stage 4 Communication:* Closer relations and connections with suppliers, customers and bankers become essential as competitors improve their services and reduce costs. Stage 4 involves EDI and other computer links to trading partners or home shoppers.
- *Stage 5 Regulation:* Corporate IT systems can help track trends, form plans, predict complex consumer preferences and provide firmer direction for the business. Here, the raw data has been converted to information and is now building up the managements' knowledge of how the business works.

This five-stage analysis is a further dimension in which vendors can segment distribution businesses when analysing market or customer potential. Most companies are still automating at stage 1. Few of the market-leading companies in Europe are well advanced beyond stage 2. Many small businesses have yet to start.

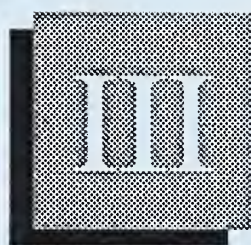
D
Leading Vendors

IBM has built a very strong business in the Western Europe distribution sector (see Exhibit II-5). It is probably IBM's largest sector in Europe. From this position of strength, IBM is putting in place a business strategy based on careful segmentation within each European country, by application and by size/type of business. In parallel, it has set up a co-ordinated attack on the systems integration market, particularly for multinationals seeking European supply chain advantage. Underpinning these activities is its new, very open approach to partnerships. IBM is determined to generate over 50% of its revenues from software and services to counter its previous dependence on hardware margins, and to give customers more relevant reasons for buying IBM.

Siemens Nixdorf looks well positioned as a credible systems competitor for IBM in both retail and wholesale sectors. It is probably the only European manufacturer about which this can be said. GSI is the strongest and most specialised independent turnkey systems vendor in the wholesale market. Over half its revenues come from supply chain (logistics) businesses. CAP Gemini is now so large that it takes the number four spot, with a strong professional services element in its business. NCR derives over 25% of its European business from the sector but have lost some business to rising retail stars like ICL.

Exhibit II-5
Leading Vendors
European Distribution Sector, 1990

| Company | Estimated Revenues (\$ Millions) | Country of Origin |
|---------|----------------------------------|-------------------|
| IBM | 345 | U.S.A |
| CGS | 140 | France |
| Nixdorf | 105 | Germany |
| GSI | 65 | France |
| NCR | 50 | U.S.A. |



EDI and Electronic Commerce



III EDI and Electronic Commerce

As business moves from being conducted in a paper-based to an electronic-based environment, profit opportunities change. Electronic systems - based on a combination of computer and telecommunication systems - particularly where software, services and intellectual property play a large value-adding role - bring about new distributions of costs, revenues and competition within an organisation, within an industry, and within an entire economy.

Electronic systems allow for the introduction of new products and services to business and consumer markets. Furthermore, users and vendors of information services and technologies are finding that their respective business operations and strategies are becoming increasingly intertwined, with the user relying on the vendor for maintenance and upgrades and the vendor relying on the user to increase its market share and enhance its on-going technical competence.

Moreover, because information systems are often equivalent or even identical to the value-adding function of the user's business itself, the user of information technologies may opt to sell its system (particularly software and services) and, in a way, replicate its business or a portion of its business for a profit. In this way, an information service user becomes an information service vendor.

The shifting profit opportunities and the intertwined, dual identities of market participants makes for a very dynamic competitive environment, one in which it is increasingly difficult for executives, managers and entrepreneurs to make strategic decisions about how to apply information technologies and where to look for new commercial opportunities and risks.

Besides the difficulty in assessing competitive opportunities and risks, the emerging electronic environment in which commerce is conducted is changing the nature of the economy. According to some estimates, "information work" accounts for as much as 70% of the GNP of the USA. Since information work is the domain of electronic, information technologies, applying these technologies to economic activity portends a major reconfiguration of work, business organisation, and productive resources.

A Electronic Commerce

To describe this fluid techno-business environment, INPUT proposes the term "Electronic Commerce." While this term has been used casually by others in the information services industry, INPUT has decided to make it a formal and distinct market classification and the basis for a commercial product: one of INPUT's market research and strategic planning services.

Examples of electronic commerce technologies can be found across all industries; for example:

- Retailing: point-of-sale (POS) and on-line purchasing systems to manage stock levels and pricing
- Distribution: electronic data interchange (EDI) and trade management systems that handle letters of credit, trade documentation, payments, shipping, and so forth to reduce delays and paperwork
- Banking: ATMs and cash management systems to facilitate fast, cheap, reliable payment and to reduce the costs of brick and mortar branches
- Insurance: sales force automation and image technology for the management of paperwork and policy issues
- Airlines: reservation systems and on-line yield management and pricing systems that manage seat inventory to maximise yield and facilitate access by travel agents
- Manufacturing: purchasing systems, computer-integrated manufacturing, and electronic data interchange to track unit costs and quality and to manage just-in-time inventories
- Magazine and newspaper publishing: satellite distribution to ensure timeliness

Many electronic commerce technologies can be utilised within a single company, Electronic commerce technologies might include:

- On the income side:
 - Consumer electronic bill payment
 - The collection of rent payments from commercial tenants
 - Direct debit of insurance premiums
 - Direct debit of maintenance agreement fees

- On the operations side:
 - Cash concentration
 - Direct deposit of payroll
 - Direct deposit of travel expense compensation
- On the expense side:
 - Credit line fee payments
 - Real estate rent payments
 - Utility payments
 - Payment of pension benefits
 - Annuity payments
 - Tax payments
 - Financial EDI to merchandise sources

Whether from an industry or an individual company viewpoint, electronic commerce is how corporations and consumers participate in market exchange using electronic communication technologies.

Commerce, by definition, is an act of communication between two or more human beings. Electronic commerce is the augmentation of human communication with electronic information technologies. In this context, INPUT's definition of electronic commerce is as follows:

- Electronic Commerce is the electronic networked-based coordination of material, people and processes that facilitates commercial exchange.

The market for electronic commerce services is measured by counting all expenditures by consumers or corporations for products or services that facilitate a commercial exchange transaction where the product or service is delivered or conducted electronically, possibly but not exclusively over an electronic network. For example, the telephone charge for the person ordering pizza from the local pizzeria is counted as an electronic commerce service expenditure, but the value of the purchase is not. The charge to use an airline reservation system is an electronic commerce charge, but the cost of the tickets is not.

INPUT measures the annual cumulative transaction costs for market participants (buyers and sellers) to use electronic commerce as measured by how much electronic commerce vendors collect in revenues. INPUT is not yet willing to measure how much of the total value of trade within the economy (what portion of GDP or GNP) is conducted via electronic commerce. This second measurement would give an indication of how much information technologies are worth. The reason for this hesitation to make such a measurement is because the value is measured in opportunity cost, an assessment of which calls for a multitude of assumptions. For example, how much would it cost for someone to make an airline reservation without a computerised airline reservation system? Many assumptions about possible technical scenarios would have to be sorted through, a very time-consuming and ultimately inconclusive (because there are so many variables) enterprise.

It is important to note that commerce, as communication among people, happens among employees of the same organisation as well as among employees of different organisations. In a generalised concept, all enterprises are chains of customers. Within a single enterprise, for example, the shipping department's customers the manufacturing sections; manufacturing has customers in sales, and so on. The chain of customers within a corporation connects the corporation's suppliers to the corporation's customers - a connection that is part of a vertical industry "value chain" of customers that ultimately delivers a product to a final consumer.

Characterising organisations in this way, we can say that electronic technologies are enabling electronic commerce to happen within as well as among firms. The inclusion of intra-organisational activity as commerce is important, because automating an organisation often leads to outsourcing an operation that was formerly performed by in-house staff. To be the most comprehensive in identifying the opportunities and possibilities that information technology generates, INPUT chooses to characterise commercial activity as occurring within companies as well as among them.

B **Technologies of Electronic Commerce**

Electronic commerce facilitates the co-ordination and communication that occurs between suppliers and their customers throughout chains of value-adding activities and processes. The emerging electronic infrastructure that supports this communication allows for a wide spectrum of technologies and applications that go by a variety of names today.

A more descriptive but not exhaustive list of electronic commerce technologies is shown in Exhibit III-1.

A possible classification scheme for these technologies is shown in Exhibit III-2.

INPUT estimates that users of electronic commerce services and systems in Western Europe spend \$68 billion for these services in 1991. This figure does not include hardware expenses. Almost 80% of this amount (\$53.6 billion) was expenditure on voice telephone services (calls for business purposes, free phone services, data communications charges and video communication charges). The remaining 21% (approximately \$14 billion) was expenditures on transaction processing services (such as airlines reservation services, credit card authorisation services, payroll processing, etc.), information services (economic and financial data bases, credit data bases, news data bases), value-added network application services (electronic data interchange, electronic mail etc - over and above the basic transport charges which are accounted for in the voice-based data service portion), and systems operations (data centre operations by an independent third party).

A breakdown of expenditures on electronic commerce by users is presented in Exhibit III-3.

Exhibit III-1**Technologies of Electronic Commerce
(Constitutive and Enabling)**

- Data Network Services
 - Electronic data interchange (EDI)
 - Electronic mail (E-Mail)
 - Data base and on-line information services including: price, financial, and statistical data bibliographic, news, and archival full-text data, credit card authorisation data and credit history, product catalogues, directory services
 - Automatic vehicle location
 - Computer-aided dispatch
 - Electronic order entry
 - Electronic buy-sell bulletin boards
 - Electronic funds transfer
 - Home banking
 - Cash management
 - ATM and POS networks
- Image Network Services
 - Facsimile, including auto fax generation and group broadcast
 - Document transmission
 - Cheque clearing
 - Credit card processing
- Voice Network Services
 - Voice mail networks
 - Interactive voice response
 - Third-party telemarketing
 - Third-party customer support
- Transaction Processing
 - Credit card processing
 - Reservation systems
 - Payroll processing
 - Freight-bill processing
 - Electronic securities trading
- Other Processing
 - Laser printing
 - Field sales support services
 - Microfiche publishing
 - Disaster recovery and back-up
 - Data entry
- Data Capture
 - Point-of-sale data capture
 - EDI transaction data bases
 - Smart cards
 - Debit cards
 - Automatic identification (bar coding, radio transponders, etc.)

Exhibit III-2

EDI in the Context of Electronic Commerce

| | Real time | Store and Forward |
|-------------|---|---|
| One-to-many | <div>Bulletin boards</div> <div>Stock quotes</div> <div>Directories</div> <div>Credit card data</div> | <div>Bibliographic data bases</div> <div>News</div> <div>Credit profiles</div> <div>Legal data bases</div> <div>(Broadcast messaging)</div> |
| One-to-one | <div>Interactive EDI</div> <div>OLTP</div> | <div>Batch EDI</div> <div>Messaging</div> <div>E-mail</div> <div>Fax</div> <div>Voice mail</div> |

Exhibit III-3

Western European Market Size
for Electronic Commerce

| | 1991 Expenditures (\$ Billions) |
|---|------------------------------------|
| Data Services | |
| Transaction Processing Services | 6.5 |
| · Industry specific (includes bank/financial processing, airline reservation systems, credit card authorisation ,etc) | |
| · Cross Industry (includes payroll processing, accounting etc) | 1.9 |
| Information Services (financial and economic data bases, etc) | 3.3 |
| Network Applications (EDI, E-Mail, VAN services, etc.) | 1.1 |
| Systems Operations | 1.5 |
| Total Data Services | 14.3 |
| Voice Services | |
| Local, Long-distance and International Business Calls (Carrier Revenues in Western Europe)* | 35.0 |
| Data Communications Leased | 8.6 |
| Total Voice Services | 53.6 |

* Includes charges for data transmissions and video transmissions.

Source: INPUT

C

Impact of Electronic Commerce

The networked economy is producing new commercial phenomena such as global manufacturing, global financial markets, and frequent buyer programs. There are many ways of bringing some kind of cognitive order/classification to the multifarious phenomena. We can look at how electronic commerce helps companies compete on cost and product differentiation (Porter's distinctions); how it helps markets clear and efficiently allocates resources (traditional economics approach); how it changes the business game - the playing field, the players, the rules, the strategies (a game theory approach).

To keep it simple INPUT will examine the phenomenon of electronic commerce in terms of how it:

- Redefines organisational and industrial structures and the roles of employees
- Allows organisations to make new offers in the marketplace
- Helps organisations reach new customers and block competition
- Helps organisations satisfy existing customers.

1. Industrial and Organisational Restructuring

Incorporating electronic and automated procedures in a value chain or chain of customers allows for the removal of many intermediaries within the chain. Within a single organisation, back-office systems handle much rote, repetitive data processing that formerly required armies of clerks. Within a value chain (for example, the textile/apparel manufacturing/retail chain) whole businesses can be eliminated (for example, certain warehousing functions) because communication and co-ordination between the key value-adding agents is better:

- Many retailers that have reduced reliance on distribution intermediaries and have direct deliveries made to stores from manufacturers. EDI has been responsible for this more efficient communication.
- A specific example of how electronic commerce can fundamentally restructure an industry is the library subscription business.

Another way electronic commerce reshapes an industry is that it allows companies-even competitors-to share market information where all participants benefit. For example, many pharmaceutical distributors and hospital buying agents have formed EDI consortia. A consortium contracts with a network processor to create aggregate sales reports from EDI traffic that flows through the network. The consortium is better able to manage its sales and hospital buying contracts.

Electronic commerce allows companies to restructure functional groups such as accounting or purchasing within the business. Many multi-divisional companies, for example Hewlett-Packard, use EDI to centralise their purchasing. Centralised purchasing is desirable because of potential volume discounts, more leverage with vendors and reduced company purchasing department costs through the elimination of unnecessary organisational redundancy.

Small customs brokering houses and transportation companies are becoming information clearing-houses, software system resellers and integrators, rather than just offering their original services. For example, AT&T is now a credit card/finance company.

2. Reduced Transactions

Another way of looking at the industrial and organisational restructuring that takes place as a result of electronic commerce is how it reduces the number of transactions associated with a commercial exchange. Transactions arise as a result of one person (or agency) transferring to another person or agency part of the work that goes into the delivery of the product or service. Costs are directly proportional to number of transactions. Whether it is taking out a mortgage, purchasing supplies, or transporting freight to a foreign destination, electronic technologies can reduce the number of transfers, and thereby, transaction costs.

As pointed out above, reducing transactions can fundamentally alter the way work is accomplished not only in organisations but also in whole industries or value chains. Some industries (for example, agenting and distribution) exist merely to handle differentials in transaction costs. With electronics, these industries, as collections of people, have no need to exist.

Eliminating the superfluous, secondary exchanges of a targeted commercial transaction is one of the goals of electronic commerce systems.

3. Redistributed Resource Usage

Telecommuting-people working at home using a computer connected to a network-illustrates how electronic commerce shifts resource use. The potential implications of telecommuting on traffic, the automotive industry, office property prices, city tax bases, urban and rural land usage, etc. are vast.

4. Variable-Cost Manufacturing versus Fixed-Cost Manufacturing

The industrial apparatus and economic system is becoming more and more reliant on network technologies. We are seeing the corporation's cost structure (and industry cost structure) become more and more one of fixed overhead costs rather than variable, labor-based costs as companies invest in more capital-intensive, technology-based systems. Electronic commerce is intrinsically a highly capital-intensive organisation of the economy.

Information technology eliminates the many intermediaries within organisations, and within value-chains, goods and services can be moved from producer to consumer with fewer transactions. Fewer people are needed to accomplish the same results. Like agriculture's transition from being the principal employer at the turn of the century, many of today's industries are providing greater output with far fewer people (particularly, for example, in banking).

Consolidation is occurring in one industry after another-banking, airlines, autos, oil, retail, utilities. Information technology is spurring this consolidation because it allows a company to increase the scale of operations without necessarily increasing its labor component. With companies increasing their volume of service, the market soon has a production overcapacity. The surviving companies of an industry consolidation resemble utilities, or administrative monopolies. The cost structures of utilities are carefully regulated and optimised. Investments in the utility infrastructure are recouped by setting consumer prices based on fair rates of return. This same kind of product pricing may apply to companies advanced in EDI or other electronic commerce markets.

5. Changing Employee Roles

One of the chief impacts of information technology is the reduction of clerical labor. Also, the portion of managers' and professionals' work that is devoted to clerical functions can be greatly reduced.

Sales representatives and procurement officers - the two sides of the commercial transaction between typical large companies - are freed of the bureaucratic chores of paperwork and can concentrate on relationship building.

D New Product Offerings

In addition to allowing a company to spin off entirely new products, electronic commerce allows a company to "fine tune" its offerings of existing products through product-feature and price differentiation.

1. Product Differentiation

Electronic commerce systems support flexible, customised manufacturing because of the better co-ordination of productive resources that EC engenders. For example, the National Bicycle Company of Japan can make a bicycle for a customer in literally millions of different product configurations, options, colours, etc. This capability will appear shortly in the automotive industry. Thus, electronic commerce supports absolutely unique product manufacture: no two products are the same.

Another aspect of product differentiation is when a company that develops information technology (software or a processing utility) for its own internal purposes decides to commercialise the development and sell it externally. This is another way of characterising the restructuring of business.

2. Price Differentiation

Electronic commerce also supports the "customisation" of price. Frequent buyer programs, first introduced by airlines and now being used in grocery stores for consumer goods, may lead to a situation in which all prices are unique. The customer (who identifies him/herself at the point of sale with an electronic identification card or number) is given price discounts on products depending on how much of the product he/she has purchased in the past.

Frequent buyer (also known as yield management) programs rely heavily on discounting prices, changing them - in the case of the airlines - millions of times per day. In the area of airline yield management systems, the aim is to ensure that (1) when a plane takes off it carries the highest profit, (2) that there are no empty seats that could have been sold at another discount, and (3) no seats are filled by passengers who paid a low fare while full-fare travellers were turned away. Only information technology, where purchasing activity can be monitored and prices can be updated by the second, makes yield management possible.

Frequent buyer/yield management programs are being introduced by credit card companies (namely, Citibank). Thus, purchases of any product entitle the purchaser to certain discounts as long as he/she uses the same credit card or payment facility.

Frequent buyer technology is being applied for corporate purchases. Hospitals have agents purchase pharmaceutical supplies for hospitals. Agent buying allows hospitals to get bulk purchase discounts. Pharmaceutical manufacturers like selling in bulk because it is more reliable and costs less per transaction. Nevertheless, to purchase in this way is information intensive. The administration of complex contracts that spell out which products, over what period of time are available from which suppliers and available to which hospitals must be managed. With electronic commerce they can be. Only electronic commerce systems permit this to happen.

In the commercial transactions between manufacturers and distributors (especially in grocery and pharmaceuticals), the distributor/buyer is often given a 2% (or some percentage) discount if it pays the invoice within 10 (or some other number) of days. Distributors negotiate these terms individually. Often it is these terms and the cash flow/float that derives from the payment timing that is a critical profit maker. A 2% price discount is an important benefit that offsets the foregone interest when a company acquires inventory.

Price differentiation, however, is tricky and companies must be careful to distinguish it from price discrimination, in order not to fall foul of laws dealing with unfair pricing and competition.

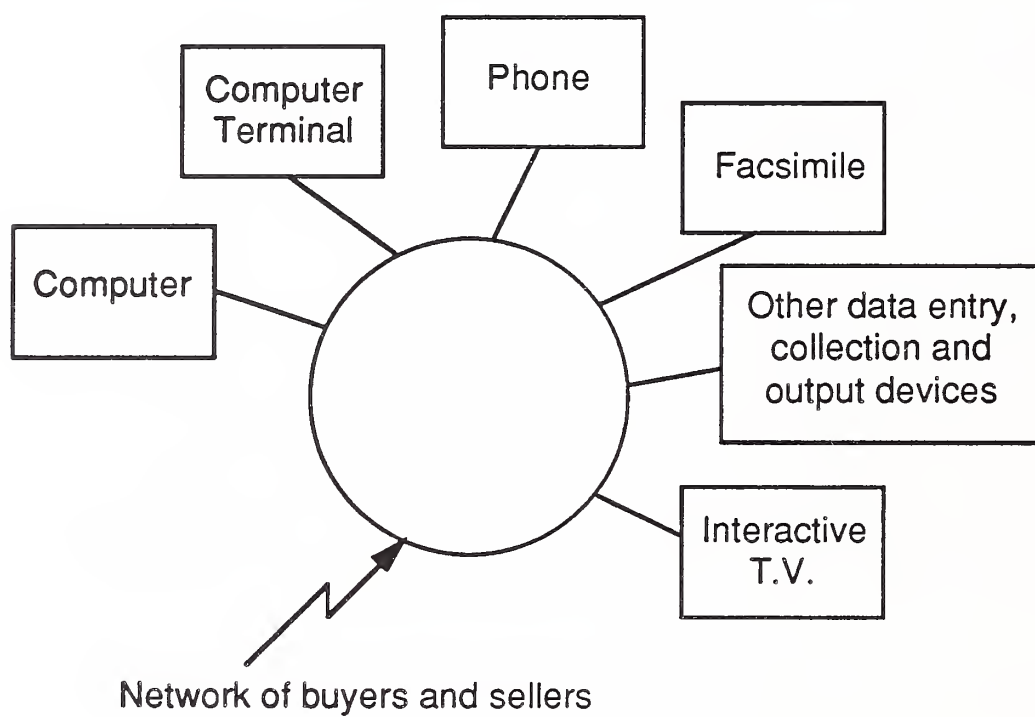
3. Market Clearing (Supply Equalling Demand)

Another way of looking at price differentiation (as mentioned above) is that electronic commercial systems help to clear markets. Whether for computer assisted securities trading or airline reservations, computers can help buyers and sellers agree on price. (Critics argue that programmed trading may introduce greater instability to already reactive marketplaces, and an investigation by the US Securities and Exchange Commission is examining this issue.) San Fransisco-based Marketel International Inc. has software that makes it possible for each airline flight to have an infinite number of fares. The electronic marketplace can be extended to any relatively standard commodity.

E Reaching New Customers

All markets are confined one way or another by physical constraints. Geographic distance (between buyers and sellers) has traditionally been the leading constraint. The constraint of electronic commerce is the requirement that any participant must have some kind of hardware device that connects him/her to the general commercial network. These devices are listed in Exhibit III-4.

Exhibit III-4

Access Devices to Electronic Commerce Markets

Investing in hardware, although a necessary condition for participation in an electronic marketplace, is usually not sufficient. Technical compatibility of the devices must be worked out, a process that has competitive consequences. Authorisation and promises to pay access fees to be on the network are other important issues. The technical-political domain of the marketplace—who is permitted to participate—is a central competitive issue. Below are some aspects of this issue.

1. Locking In Customers, Locking Out Competition

Electronic commerce systems, because they rely on a networked, technical platform, usually have some entry costs for the market participants. These costs include system components, terminals, network charges, and the integration of terminals with existing applications. Airline reservations systems and on-line hospital ordering systems for medical supplies are well-known examples.

Also, large network-based markets can be dominated by a single vendor which implements its own standard for communication (often referred to as a proprietary EDI system). Some examples are SWIFT's SWIFT I network, the LACES cargo handling systems for London airport and even the SEDAS distribution sector standard which was implemented in the German speaking countries - all of which could be considered proprietary.

When a company first offers an electronic ordering system, it wants to keep it proprietary, thus preventing its competitors from selling to its customer base. After a certain point, however, the company's customer base wants all of the market's suppliers to be reachable through a single, uniform system. The original vendor of the proprietary system can opt to allow its competitors into its own proprietary pipeline or to migrate its system to a standardised one. Standardised systems, in the end, are less costly for the vendor because the customers and competitors in the market can directly pick up the cost of building and maintaining the equipment and software infrastructure that maintains the electronic market.

2. Access and Flexibility

Electronic commerce systems allow greater flexibility in that they deliver more options to buyers and sellers.

The US federal government (General Services Administration and the Defense Logistics Agency) is devising a system that would broadcast all government request for quotations to a central data base repository. Any vendor throughout the country would be able to access the data base to make a response. By broadcasting the RFQs over a network, more vendors can respond than if it were broadcast by other means. International trade leads, gathered throughout the world by embassy business attaches, are also broadcast over bulletin boards. The European Commission host (ECHO) offers TED (Tenders Electronic Database) as an on-line service to organisations wishing to tender for commission projects.

3. Standardisation

Integrated, inter-organisational systems of production typically require the co-ordination and operation of many complementary constituent parts. Industries that provide the parts for these systems will adopt standards to allow many vendors to provide compatibility among their respective products and allow users to assemble the necessary systems. Multi-component, multi-agent industries can be called networked industries; historical examples include railroads, electric power utilities, and telephone industries. All such industries utilise increasing-returns technologies that link their users - physically or otherwise - in a network. The dynamics of networked industries, which have strategic competitive implications for both users and vendors of network technologies, are highly relevant to electronic data interchange and other electronic commerce markets.

World commerce is being transformed from a paper standard to an electronic standard for business communication. The standardisation of the new electronic environment has competitive and efficiency implications. Locking in on a certain standard (such as UNIX, or SPARC chips, or X12 rather than EDIFACT) determines the subsequent path of commercial development and opportunity. A standard may prove to be imperfect (such as the QWERTY keyboard) and a better one may be devised (the Dvorak keyboard) but, because the installed base of the sub-optimal standard is large, the costs of retrofitting are too high. In many cases the better standard is never implemented.

Setting standards involves anticipating and designing the future. These undertakings are often bound to fail to some extent. Capturing installed base, making products to accommodate sub-optimal standards, moving from old standards to new ones - all these activities are part of today's competitive electronic commerce environment.

4. Increasing Returns to Scale/Leveraged Recurrence

EDI systems initially cost more (in software, network services, and systems integration) than using traditional paper-based systems. Also, an EDI system will probably never entirely replace a paper-based system. Thus, for an EDI system to pay for itself, it must process a large volume of transactions. This is characteristic of all electronic commerce systems. Electronic commerce has an initial high investment and overhead cost that is justified only by the system being used in a great number of recurrent operations.

Like the telephone specifically, electronic commerce in general requires a certain critical mass of users before it becomes a useful medium. The first telephone subscriber has a useless system on his hands: there is nobody else to call. As the number of subscribers on the network expands, the usefulness of the network expands at an exponential rate.

There is an industry-wide phenomenon associated with electronic commerce. Electronic payment services among a community of banks operate at the level of effectiveness of the least efficient bank. Because commerce takes place between the companies of all banks, all banks must have a common, standardised electronic payment format that they can all send to each other and process. Today, there are various formats for electronic payments. Only a handful of banks have the capacity to originate and process the most efficient formats. But their ability to do so is not exploitable because very few other banks can use this format. The payment system as a whole is diminished because not all banks have equal capacity. The more banks that can process the more-efficient formats (i.e., the greater the scale of optimal-format processing capacity), the greater the overall economic return of the payment system as a whole.

This can be called a "weakest link" or "lowest common denominator" syndrome/effect.

F

Satisfying Existing Customers

Electronic commerce facilitates the making, negotiating and consummating of commercial exchanges. The goal is to make the operation of a given business not a barrier between the customer request (for service or product) and customer satisfaction. Historically, the time and cost for a company to fulfil a customer request has led to dissatisfaction. Appropriately installed, electronic commerce systems overcome these barriers to customer satisfaction.

The just-in-time (JIT) and quick-response (QR) strategies in manufacturing and distribution are well known. These strategies rely on more than just electronic information technologies. However, computers and telecommunication lines are critical components of the strategies. The objectives of JIT and QR strategies are to improve response time between supplier and customer and to continually reduce price. Examples of these strategies are many and further mention is not necessary.

1. Monetary Redefinition: Electronic Bartering

An interesting phenomenon that might be included in the category of customer satisfaction is how money and finance can be changed by information technology. Money and information technology are both tools that facilitate commercial exchange and, as such, are not different phenomena but different aspects of the same phenomenon. Money, in the words of the chairman of the Citicorp, is "information on the move." As a "medium of exchange," information technology can be identical to money and can itself play the role of money.

Large companies that buy from each other (e.g., Motorola buys workstations from Digital; Digital buys semiconductors from Motorola) and use EDI to do so are finding that they can revert to "electronic bartering." Computers keep track of the transactions between the two companies. At the end of a period, the net owed amount is determined and a single payment is made. This reduces the costs of raising payments for each individual transaction. Netting systems for banks are another form of electronic bartering.

Widespread use of electronic bartering would reduce the payment-services business that banks provide.

The use of smart cards and debit cards could also potentially erode banks' control of the payment franchise. A Japanese department store, vending machine operators, public transit companies and telephone companies are issuing cards to consumers for prepaid amounts (the consumer pays a specified amount up front; the card is credited with this amount; every time the card is used it is debited). The money that these cards represent is outside of the traditional banking system of a country (there is no central bank control).

Merrill Lynch's cash management account is another example of information technology allowing the creation of a new kind of financial instrument. To savers, the cash account is a high-yield savings account with complete liquidity. But the money is actually invested in a broad variety of financial instruments.

The use of information systems to supplant money creates challenges to government bodies. In addition to encroachments on central bank control, information technologies could potentially make more difficult the collection of taxes by tax authorities if electronic bartering arrangements are established among companies.

Funds represent promises to produce action in the future. In this sense, money is no different than the majority of other communications that constitute electronic commerce. Electronic commerce is people making promises to each other (to deliver goods, services, or cash) over electronic networks. Viewing money as a particular kind of promise is useful in determining how a company should take advantage of electronic commerce possibilities.

Exhibit III-5 shows the spread of EDI services across Europe, sector by sector and country by country. It provides visual confirmation of the widespread use of EDI in the distribution sector.

Exhibit I
EDI Users by Country and Sector

INDUSTRIES

Discrete
ManufacturingProcess
Manufacturing

Distribution

Trans-
portation

Utilities

Communi-
cations

Banking

Insurance

Government

Agriculture

Construction

Education

Health Care

Services

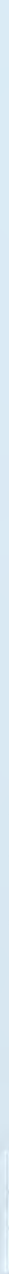
Cells contain: • Significant EDI projects
• Estimated numbers of user/subscriber companies

| | Discrete Manufacturing | Process Manufacturing | Distribution | Trans- portation | Utilities | Communi- cations | Banking | Insurance | Government | Agriculture | Construction | Education | Health Care | Services |
|--|---------------------------|--------------------------|--------------------|-------------------------|--------------------|---------------------|---------------|------------------------------|---------------------------|--------------|-------------------|--------------|-------------------------|---------------------|
| Europe | Odette Edifloc | CEFC | EAV/ EANCOR | EDIS AIR/IMP | | ICA | SWIFT EBIC | RINET | EDIS | | EDIBUILD | | EMEDI AIM | EDIFICAS |
| U.K. | SMMT 400 | Pharmet | Tradenet 3,000 | 1,600 | | EDIPost | (BACS) | LIMNET BrokerNet 1,100 | CHIEF HEART PURSUIT | | EDICON | LEAGS 120 | TF2 NHSPLUS ETHOS | AMEDIS |
| France | Galia 200 | EDI PHARM | GENCOD 300 | ESCALE PROTIS 100 | EDIGED EDILITES | | (ETEBAC) | ASSURNET | EDSI DOKANEDI CALS | | EDICON- STRUCT | | | EDIFICAS EDIJUST |
| Germany | VDA 750 | VCI | CGS/SEDAS 2,000 | DAKDSY 170 | | ELFE | | GDY | | | EDI-BAU | | | |
| Italy | Odette 700 | PUSHED | INDSCOD | COST 306 | | | | | | | | | | |
| Netherlands | Odette 150 | | SUAC 1,000 | INTIS ERTIS 200 | | | (GOO) | ADN 1,000 | SAGITTA GBA | | | | IMDF | |
| Belgium | 60 | | ICODIF 60 | SEAGHA | | | | ASSURNET | | | | | Hospinet | |
| Spain | 300 | | AECOM | | | | | | | | | | | |
| Sweden | Odette 170 | | DAKOM | SWECOM | | | | | TDS | | DK-BYGG | | | |
| Denmark | | | DVAOSK | TEDSF | | | | | | LEC 1,000 | EDIBYG EITI | | | |
| Finland | | | 100 | | | | | | Customs | | | | | |
| Norway | | JIB | NVF | NODI 200 | | | 1,500 | | TVINN | | | | EDINED LABKOM | |
| Austria | Odette/VDA | EDIPAP | ECODEX 200 | | | | | | | | | | | |
| Switzerland | | | NEANDER | CSS-CH | | | | | ZOLL 90 | | | | | |
| Rest: - Greece - Portugal - Ireland | | | ANAI | POLAS ICARNS | | | | | | | | | | |

COUNTRIES



Distribution Market Analysis



IV Distribution Market Analysis

A Market Structure and Overview

1. Market Forecast

The distribution sector market for industry-specific software and services (the subject of this report) represented 5.4% of the total West European market for software and services in 1990. If generic and cross-industry software and services are included, the total represents 8.5% of the total European figure. The industry-specific market is estimated to be worth \$4.1 billion in 1991, and is forecast to grow to \$7.1 billion in 1996.

The compound annual growth rate for the sector between 1991 and 1996 is forecast to be 12%. This forecast growth is below the growth of the whole European market. Although the distribution market is expected to be extremely active over this period, user expenditure will be moderated by two factors.

- Users will continue to exercise tight financial management when purchasing software and services. As traders they are used to driving hard bargains with suppliers.
- Fierce competition among vendors looking to gain market share, accompanied by a general move toward open systems, will keep prices down.

Mergers, acquisitions and alliances will continue among European retailers and wholesalers, stimulated by the search for more profit as both opportunities and competitive threats increase through 1992. As such retail concentration continues, many wholesale businesses will fall prey to the expansion plans of retail chains, transport companies, or manufacturers all looking for better returns from and control of their own supply chain. For this reason user expenditure in the wholesale sector is expected to grow more slowly than in the retail.

Of the seven delivery modes shown in Exhibit IV-1, professional services and turnkey systems will dominate with 63% of the market in 1991. By 1996, this share will have dropped to 57%, as the faster growing network services, applications software products and systems integration contracts build up.

Traditional processing services are no longer a growth market. The vendors are re-emerging with more relevant positioning in network services and facilities management. Distribution companies have been slow to contract out systems operations - seeing them as fundamental to their fast moving businesses.

Exhibit IV-1

Distribution Sector
Software and Services Market 1991-1996

| | \$ Millions | | | | |
|--------------------------------|-------------|-------|-------|--------------------------------|-------|
| Subsector | 1990 | 1991 | 1992 | 1991-1996 CAGR (Percent) | 1996 |
| Processing Services | 310 | 310 | 300 | -1 | 300 |
| Turnkey Systems | 1,100 | 1,230 | 1,330 | 10 | 1,960 |
| Applications Software Products | 430 | 500 | 580 | 16 | 1,050 |
| Professional Services | 1,200 | 1,340 | 1,450 | 10 | 2,110 |
| Network Services | 340 | 400 | 460 | 17 | 890 |
| Systems Operations | 60 | 70 | 80 | 16 | 150 |
| Systems Integration | 230 | 270 | 320 | 19 | 150 |
| TOTAL (ROUNDED) | 3,650 | 4,100 | 4,500 | 12 | 7,100 |

Network services are the cornerstone of the concept of supply chain systems. The physical movement of goods over a distribution network - from manufacturer through to consumer - will be matched by an equivalent information network offering EDI (Electronic Document Interchange) and other services. The objective is to be able to track every item if necessary, and to be able to pass documents along the chain quickly and cheaply, independent of the goods themselves. The leading vendors, INS (a joint venture between ICL and GEIS), Digital, IBM and AT&T Istel may be impeding faster acceptance of EDI by their enthusiasm to promote their own versions, while the international EDIFACT standards are finalised and customers remain confused. The commercial user interest required to force the market pace will only come from some single-minded manufacturers or retailers imposing timescales on their suppliers-as GM and Ford did in the motor industry. Distributors are waiting to be told to use EDI by their customers.

While network service vendors require heavy up-front investment and long-term business development plans, the exact opposite can be true for originators of applications software products. The diversity of retail and wholesale businesses in the distribution sector has led to a huge proliferation of vendors and products. INPUT forecasts that this situation will persist well into the 1990s, with applications software products for PCs and workstations contributing the most to market growth. This delivery mode clearly offers the software product developers with detailed market knowledge the most opportunity. In-depth knowledge of a retail or wholesale subsector and modern portable software platforms and tools can be a winning combination. This is the area in which the equipment vendors make most use of innovative third parties. For example, IBM announced equity stakes in two distribution sector software specialists-Worldwide Chain Store Systems and PR Johnson.

2. Leading Vendors

Exhibit IV-2 lists the leading vendors of software and services in the distribution sector across Europe. IBM has been particularly successful in the European distribution sector, identifying it as a key area for growth and probably its largest in Europe. INPUT estimates that IBM hardware platforms account for over half the value of equipment delivered in this sector. IBM's future direction is being masterminded from its newly established European Distribution Development Group at Eastleigh in the U.K. The strategy is to position IBM to deliver the exact solutions that each customer wants. There are five major components to its drive for growth which will ensure that IBM remains a formidable competitor:

- A very strong portfolio of IBM and third-party applications packages and specialised equipment such as POS terminals. These are being carefully selected to meet requirements in markets segmented by country, by subsector, by business function and by size of business.
- An umbrella architecture including Retail/SAA and a midrange operating system strategy inclusive of OS/400, AIX and PS/2 is used to encourage application developers and reassure customers.
- Strong retailing and wholesaling expertise within its European network services team-a separate business unit running services on IBM's worldwide network INS.
- An aggressive systems integration business strategy for winning major national and international bids.
- A partnership strategy allowing IBM to combine the best of the systems and application skills it has built up in-house, with those of its partners among the leading specialist independent vendors in the distribution software and services.

Exhibit IV-2**Leading Vendors in Western Europe
Distribution Sector, 1990**

| Company | Estimated Revenues (\$ Millions) | Country of Origin |
|---------------------|----------------------------------|-------------------|
| IBM | 345 | U.S.A |
| CGS | 140 | France |
| Nixdorf | 105 | Germany |
| GSI | 65 | France |
| NCR | 50 | U.S.A. |
| ICL | 35 | U.K. |
| Olivetti | 35 | Italy |
| * Bull | 30 | France |
| Sema | 25 | France |
| Sligos | 25 | France |
| Digital | 20 | U.S.A. |
| Andersen Consulting | 20 | U.S.A. |
| GEIS | 20 | U.S.A. |

Note: Cross-industry and generic software and services revenues are omitted from these industry-specific distribution sector estimates.

IBM is determined to generate over 50% of its customer revenues from software and services. Having entered the systems integration business just five years ago in Europe, IBM is now getting more than 5% of its business by this route.

Exhibit IV-3**Industry-Specific Software and Services
Distribution Sector, Europe**

| | \$ MILLIONS | | | | |
|--------------------|-------------|-------|-------|-----------------------------------|-------|
| SUBSECTOR | 1990 | 1991 | 1992 | 1991 1992 CAGR (PERCENT) | 1996 |
| Retail | 1,500 | 1,700 | 1,950 | 16 | 3,500 |
| Wholesale | 2,150 | 2,400 | 2,550 | 8 | 3,600 |
| Total Distribution | 3,650 | 4,100 | 4,500 | 12 | 7,100 |

3. **Retail Sector**

The retail industry subsector for software and services vendors is led by the specialist POS suppliers. However, very few companies cover the whole industry. The top 20 vendors of industry-specific software and services in the distribution sector account for about 35% of the total retail market in Europe. Exhibit IV-3 shows the relative sizes of retail and wholesale subsectors.

Systems and professional services vendors are all looking to broaden their portfolio of applications and to establish or maintain market leadership within the many niche markets in this sector. Market segmentation is apparent on two dimensions:

- The style of organisation, e.g., supermarket, multiple, department store and cash-and-carry
- The type of products, e.g., food, oils, textiles and shoes

NCR and ICL are the two equipment vendors that are clearly focussed on the retail sector rather than on wholesale, and on in-store point of sale rather than on headquarters mainframe or distribution centre processing. Both are well aware of the blurring boundaries between the sectors and can be expected to diversify to encompass more of the supply chain in future.

Exhibit IV-4

**Leading Software and Services Vendors
in Western Europe Retail Sector, 1989**

| Company | Estimated Revenues (\$ Millions) | Country of Origin |
|----------|----------------------------------|-------------------|
| IBM | 145 | U.S.A. |
| CGS | 80 | France |
| Nixdorf | 55 | Germany |
| NCR | 45 | U.S.A. |
| Olivetti | 30 | Italy |
| ICL | 30 | U.K. |
| GEIS | 14 | U.S.A. |
| Digital | 9 | U.S.A. |

4. Wholesale Sector

The wholesale industry subsector is even more fragmented than the retail subsector. The top 20 in this case represent only one-quarter of the total market for industry-specific software and services. At issue is the management of the physical distribution of products, components and raw materials. Competition is keen, with strong margin pressure from retailers, manufacturers and transport contractors. In addition, as retailers and shipping companies grow stronger, the wholesale function is being absorbed into their business functions. This is forcing wholesalers to add greater value and use more sophisticated business techniques to differentiate themselves and grow.

Large wholesalers and retailers have significant investments in mainframe systems, but at the store, warehouse and headquarters levels there is a strong trend toward physically distributed minicomputer and PC or workstation systems.

Exhibit IV-5

Leading Software and Services Vendors in Western Europe Wholesale Sector, 1990

| Company | Estimated Revenues (\$ Millions) | Country of Origin |
|---------|----------------------------------|-------------------|
| IBM | 200 | U.S.A. |
| GSI | 65 | France |
| CGS | 60 | France |
| Nixdorf | 50 | Germany |
| Bull | 25 | France |
| Sligos | 20 | France |

B **Delivery Modes**

1. Processing Services

In real terms this delivery mode is a declining market. It has never had as strong a role in the distribution sector as is typical in other industries, and rapidly went out of style as companies invested in in-house inventory management and accounting systems.

User expenditure on industry-specific processing services in the European distribution sector is estimated to be \$310 million in 1991, falling to only \$300 million in 1996, a CAGR of -1% (negative real growth of 5%). Within this business, but not broken out in the exhibits, is some \$55 million of systems operations (such as facilities management) in 1991, growing to \$125 million (CAGR of 18%) in 1996.

2. Network Services

INPUT estimates that user expenditures on network services in the distribution sector of Western Europe in 1991 will be \$400 million, rising to \$890 million in 1996. This represents a CAGR of 17% over the five-year period.

The major vendors of network services in Europe have each concluded that their provision of international added-value networks is an essential element in their strategy to build:

- Customer loyalty
- Industry sector knowledge
- Add-on business
- Pan-European reputation
- Sector market share
- Multivendor systems capability

With such high interest in mapping physical distribution onto equivalent information networks, it is not surprising to find that all the vendors specifically target the distribution sector. In fact, ICL and Digital both have versions of their network services positioned and marketed exclusively to the distribution market. For example:

- ICL's RSM-Retail Systems (network) Manager
- Digital's DIN-Distribution Information Network

In addition, all the major equipment vendors in this market offer a (unique) standard systems architecture. This architecture includes the standards necessary for building networks of their own computers and applications, plus the ability to integrate systems built on other manufacturers' platforms.

Some brief comments on EFTPOS (Electronic Funds Transfer at the Point of Sale) are included in the text for each country market in the report. The differences among countries are so significant that it is inappropriate to offer a general European comment here. It is a subject dealt with in more detail in the banking and finance sector analyses (see Related INPUT Reports-Chapter I section F).

The following chapters describe the influence of electronic commerce across the whole supply chain, including EDI usage.

3. Applications Software Products

This delivery mode covers industry-specific applications software products sold unbundled from any equipment or professional services such as planning or implementation. Bundled turnkey application packages are included in the turnkey systems category. INPUT estimates that user expenditures on application software products in 1991 will be \$500 million, rising to \$1,050 million in 1996. This represents a CAGR of 16% over the five year period. The applications software products included in turnkey systems doubles this forecast, making a total market of about \$1.0 billion in 1991, rising to \$2.0 billion in 1996.

As shown in Exhibit IV-6 the most obvious trend among all vendors is the migration from mainframe to minicomputer and minicomputer to PC or workstation. This downsizing of software products has been underway for some time, but shows no sign of changing. Recent announcements by IBM of distribution products for their latest System 390 or ES/9000 mainframe range may slow the trend for a while, but not for long. In fact, these announcements will undoubtedly stimulate demand for more packages, joining the RS/6000 AIX systems as yet another alternative to IBM's midrange AS/400 systems.

Mainframe users have done a lot of in-house development in the past, in spite of the success of vendors like German software company SAP, and of IBM, with their own Inforem inventory management package (now in its third generation form-rewritten for CICS). However, this is changing as users find they just cannot afford to develop and maintain their own software, especially since these types of very high function and flexible packages have appeared. There are about 10 software vendors in Europe that specialise in IBM mainframes and the distribution sector, including SAP, WCSS, and Dallas. Users find these companies offer proven products, a user community and the opportunity to add their own functions for unique working practices or competitive edge.

Exhibit IV-6

**Distribution Sector Application Software Products
Software and Services Market, Western Europe 1991-1996**

| | \$ MILLIONS | | | | |
|---|-------------|------|------|-----------|------------------------------|
| APPLICATIONS SOFTWARE PRODUCTS SUBSECTOR | 1990 | 1991 | 1992 | (PERCENT) | 1991 1996 CAGR 1996 |
| Mainframe | 50 | 50 | 50 | 0 | 50 |
| Minicomputer | 150 | 170 | 190 | 11 | 290 |
| Workstation/PC | 230 | 290 | 350 | 20 | 730 |
| TOTAL (ROUNDED) | 430 | 500 | 580 | 16 | 1,070 |

Minicomputers (including IBM's AS/400 and its predecessors) have long been the applications platform for most medium-sized companies. This encompasses most of the larger wholesalers, few of which exceed \$200 million turnover. Traditionally, these minicomputers have supported an integrated business system, managing accounts, inventory, order processing, etc. Most of the growth in this market is now in departmental systems, rather than whole company systems, as distributed applications become a more cost-effective solution. For example, separate minicomputers are being used for in-store, warehouse, marketing, materials and accounting systems. Digital's strength in networked solutions has been a major force in getting such solutions accepted in the larger companies. Several hundred application packages are available on minicomputers in this sector.

The most common forms of PCs or workstations in this sector are the ECR (Electronic Cash Register) and the EPOS (Electronic Point of Sale) terminal. Nearly all current POS products use MS-DOS, with some also running UNIX. In addition, very large numbers of conventional PCs are being used in a similar way to the departmental minicomputers, but in smaller departments, sites or businesses. Applications software, rather than the hardware specification, has become the primary basis for choosing a system. There are well over ten thousand PC applications products in the European distribution sector.

One of the largest untapped opportunities in the distribution sector lies in offering small shopkeepers and supply chain middle-men easy-to-use software-for the price of a cash register or two-for managing their businesses. Some of the leading equipment vendors believe that such products are now less than two years away from widespread availability.

The vendors interviewed all believe that applications software products are critical to their market success in distribution. Areas expected to receive the most attention in future include:

- Human Resource Management
- Customer Care Applications
- Property and Space management
- DRP-Distribution Resource Planning
- Logistics Decision Support
- Local Store/Depot Decision Support
- Pan-European Support

New technology is driving other applications:

- Item Tracking
- Home Shopping
- Warehouse Automation
- Route Planning/Vehicle Scheduling
- Demand Forecasting (Expert) Systems
- Merchandising Support

Although there are huge numbers of existing products, all the major vendors are still seeking wider portfolios with which to win business. Few products yet meet the general requirements listed below:

- Specialist use by business subsector or department
- Conforms to equipment vendor's chosen architecture(s)
- Portable and scaleable across different platforms
- Can coexist in a distributed environment
- Suitable for supporting local languages and working practices
- Modular and rich in function
- Easily tailored without writing programmes
- Packaged training and retraining for users
- Adequate performance for time-critical core business functions
- Demonstrably reliable with a community of users

4. Professional Services

Exhibit IV-7 shows user expenditures on industry-specific professional services in the European distribution sector have been reviewed by INPUT and are estimated to be \$1,350 million in 1991, rising to \$2,100 million in 1996, a CAGR of 10%. Other professional services are included in two other categories-systems integration and turnkey systems.

The trend to contract out more services will continue, but with a changing emphasis. As applications products become more capable of meeting requirements for function and adaptability, so the demand for custom software will slow. However, this will be compensated by growth in consultancy, education and training.

Users are now seeking more than the technical consultancy they have used in the past. They seek business consultants who can help them adapt their businesses to new information-rich working practices. This could be the most significant brake on market growth, because a large percentage of vendors are already experiencing a shortage of such talent. The largest equipment vendors are making maximum use of their own experts-staff from their own internal European distribution functions-who have been using the latest systems and software to cut costs and improve customer deliveries of both products and spares. Digital, for example, has recently established a single European, fully automated distribution centre for the delivery of all its products, and halved the cost of their operations.

Exhibit IV-7

Distribution Sector Professional Services Market Western Europe, 1991-1996

| | \$ MILLIONS | | | | |
|---------------------------------------|--------------|--------------|--------------|-----------------------------------|--------------|
| PROFESSIONAL SERVICES SUBSECTOR | 1990 | 1991 | 1992 | 1991 1996 CAGR (PERCENT) | 1996 |
| IS Consultancy | 180 | 190 | 210 | 10 | 310 |
| Custom Software | 860 | 980 | 1,060 | 10 | 1,550 |
| Education & Training | 160 | 170 | 180 | 8 | 250 |
| TOTAL (ROUNDED) | 1,200 | 1,350 | 1,450 | 10 | 2,100 |

Education and training are seen as critical areas by vendor and user alike, particularly in view of the high turnover of staff in the distribution business-many shops use a high proportion of low cost, part-time workers, and the labour pool for warehouse operations also has a high content of temporary staff. The introduction of new technology often results in new working practices, which require still more training. The down side is that this area is always the first to get cut or forgotten in the heat of day-to-day running of a business. It is inevitably true that tomorrow's retail and wholesale market leaders will be those who have given the education and training of their staff the priority it needs. Among the vendors, the winners will be those who can build-in user training as part of their packages (using computer-aided learning techniques as well as classroom learning), and can then deliver in volume and with good quality. It is worth noting that consumers' loudest criticism of retailers is the lack of knowledgeable and helpful sales staff.

Equipment vendors are giving a lot of new-found attention to the development of their professional services capability. In the past, many of their services, such as technical consultancy, feasibility studies and performance audits, have been bundled into the price of a system-treated as cost of sale items. There is pressure from vendor management to unbundle these activities and price them properly. Some major users are also asking for services to be priced properly. Their logic is that they currently have to fight hard to get this type of resource from equipment vendors, due to the shortage of experienced vendor staff. If it was run more as a business in its own right, then the vendors could better plan and manage the availability of resources to match the customers' willingness to pay for them. Both parties would be better off-the customer receiving the services he needs and the vendor generating directly related revenues and margin.

For the independent software vendors, the potential threat of competition from the equipment vendors is minimal. Few equipment vendors, with the exception of Nixdorf, have the expertise or staff to address detailed design and implementation of application systems in any volume. They still depend heavily on the independent third parties and the customers' DP departments to provide these skills.

All vendors see the shortage of trained professional services staff as a potential limit to their own growth prospects, even though the same factor is the primary driving force for the user community to contract out. One or two vendors already have plans to counter the looming shortfall of young trainees as the numbers of school and college leavers falls over the next few years.

5. Systems Integration

INPUT estimates that user expenditures on systems integration in the distribution sector of Western Europe in 1991 will be \$220 million, rising to \$650 million in 1996. This represents a CAGR of 19% over the five-year period.

Although INPUT's definition is simple, in the minds of vendors, systems integration can have many meanings. The term is used by vendor staff to define a wide range of subjects, from networking and user interface architectures, to any major custom contract. Many users still have no clear idea of what "systems integration" means to them. INPUT's definition separates systems integration from all the other delivery modes by assuming high levels of complexity in each systems integration project. This complexity will be apparent in three areas:

- The technical complexity of a solution sourced from multiple suppliers and valued at the multimillion dollar level
- The client insistence on one vendor being the prime contractor for the complete solution
- The implementation of the project having a significant impact on the users and their business environment

IBM promotes systems integration as the solution for its largest customers. The combination of IBM computers, software, networks and services with third-party software, hardware and services, all under IBM project management, is the way to provide a total solution to the customer-the benefits being one price, one partner, and clear responsibility.

The equipment vendors are clearly seeing systems integration as a route to improving account control in the face of plug-compatible or open systems and falling hardware margins. The role of "preferred supplier" offers vendors many advantages in terms of forward planning and minimising costs. As users switch their allegiances from hardware to software, all the major vendors have adopted a systems integration strategy to keep close to their major customers.

Many systems integration vendor's aspirations are unlikely to be matched by the market demand. There is still a huge task of educating both vendor staff and customers to understand the implications of their vendor being a "systems integrator". Equipment vendors in particular seem to have convinced themselves that they will be more highly valued and profitable if they position themselves as systems integrators (service companies) rather than as manufacturers (product companies.) The cultural changes implied may prove too much for some vendors.

The pan-European alliances occurring in distribution are already generating a growing demand for more complex national and cross-border operational systems. Clients for systems integration express their needs in terms of business information problems, and the exploitation of existing systems and applications in a wider business environment-most often in terms of supply chain and logistics problems.

The scale and complexity of such schemes are often seen as beyond the technical skills of the in-house staff. Major projects in the past have had a habit of severely overrunning on cost and time. To find that major system vendors are now willing to supply such complex total solutions and take on the technical and commercial risks, is highly attractive.

The effect of these new choices for users is to encourage far more cooperation among vendors than ever before. Companies that are competitors now also partner each other when it seems a more likely way to win the business. Even IBM recognises that it cannot go it alone.

- Equipment vendors bidding directly through their own sales forces
- Equipment vendors bidding through a VAR or other third party
- Large/medium professional services vendors bidding directly, and usually choosing equipment with guidance from the customer

Smaller vendors would not normally win projects which fall within INPUT's definition of systems integration. The larger independents are wary of the equipment vendor's taking the lead role, but are willing to let the customer decide on whom he prefers as prime contractor.

6. Turnkey Systems

User expenditures on industry-specific turnkey systems in the European distribution sector are estimated to be \$1.2 billion in 1991, rising to \$2.0 billion in 1996, a CAGR of 10%. This delivery mode covers the application solutions which come packaged complete with hardware, software and implementation support.

As discussed under Applications Software, the demand for packaged solutions is growing well in this market, as users switch from in-house development to more off-the-shelf solutions. The custom software element of these systems is expected to steadily decline over the next five years. This is in response to several factors:

- Customers are continually looking for cost savings in their acquisition of business solutions.
- Well-designed application software products with much richer functionality are now far easier to tailor for a particular client.
- Clients now accept that organisational changes and new working practices should accompany the installation of many new applications.

In the past there has been a tendency for the application to be adapted to the organisation, rather than the other way about. Since many new applications-like DRP (Distribution Resource Planning)-reflect more up-to-date business practices, users can see the sense in changing the "way things are done here" to get full benefit from their IS investment.

The two leading turnkey vendors (Nixdorf and GSI) have both invested heavily in re-engineering applications for greater portability and flexibility and to make downsizing onto smaller hardware platforms easier.

C Country Markets

The U.K. leads Europe in terms of IS spending per dollar of retail revenue, with a ratio of about 0.40%. In other words, for every hundred dollars spent by U.K. consumers in 1989, the distribution companies spent forty cents on software and services. In France this figure was 0.30% and in Germany 0.25%

1. France

The big success story in the French distribution sector has been hypermarkets. There are now over 800 such outlets in France, and the leading companies are expanding elsewhere, particularly in Italy, Portugal and Spain. Family businesses are still strong in France, accounting for some of the leading retailers, and home shopping has become established practice through the widespread use of Minitel terminals in seven million homes. The wholesale sector contains 80,000 businesses and is growing fast, encouraged by France's pivotal position in Europe with many key national trading borders and a very positive attitude towards the 1992 EC initiatives.

Distribution sector user expenditures on industry-specific software and services are estimated to reach FF6.0 billion in 1991, growing to FF10.0 billion by 1996, a CAGR of 17%. Exhibit IV-8 gives the breakdown by delivery mode.

Exhibit IV-8

Distribution Sector Software and Services Market France, 1991-1996

| | FF MILLIONS | | | | |
|-----------------------------------|--------------|--------------|--------------|-----------------------------------|--------------|
| SUBSECTOR | 1990 | 1991 | 1992 | 1991 1996 CAGR (PERCENT) | 1996 |
| Processing Services | 480 | 470 | 440 | -5 | 370 |
| Turnkey Systems | 920 | 1,000 | 1,100 | 8 | 1,500 |
| Applications Software Products | 630 | 740 | 840 | 14 | 1,450 |
| Professional Services | 2,550 | 2,850 | 3,050 | 8 | 4,250 |
| Network Services | 480 | 550 | 640 | 17 | 1,200 |
| Systems Operations | 65 | 75 | 80 | 13 | 140 |
| Systems Integration | 290 | 350 | 410 | 9 | 840 |
| TOTAL (ROUNDED) | 5,400 | 6,050 | 6,550 | 10 | 9,750 |

GSI is among the strongest independents in the distribution sector. Over half its revenue now comes from supply chain (logistics) businesses. It has signed a marketing agreement with Digital (both a turnkey systems equipment supplier and a major customer for its Tolas distribution software) to distribute GSI's Tolas internationally through Digital's sales channels.

EFT in France is centred on the use of intelligent (chip) cards, pioneered by Bull and adopted by all the major French banks. By the end of 1991 all EFT systems will accept chip cards, and by 1992 all the stripe cards will also include a chip. Retailers will be encouraged to introduce EFTPOS (Electronic Funds Transfer at the Point of Sale) with the banks, keeping handling charges down to a low 0.8% of turnover.

Most data interchange in France is still accomplished by direct custom links to manufacturers and retailers. This is expensive to implement and difficult to maintain as business practices change. In effect, the distributors have to tap into their customers' information systems, each of which is totally different from the next. Distributors feel they cannot set the pace for standards, they have to wait for their customers to lay down the law.

2. Germany

Germany has the largest retail sales per person in Europe. It also has the largest retailers in Europe. Eight of the top 20 European distribution companies are German. However, strict monopoly controls mean it is less dominated by large companies than either France or the U.K. Major demographic changes in the form of an aging population and severe reductions in 18 to 25-year-olds are already affecting both consumer demand and the availability of work force labour in the distribution sector.

Germany is seen as the market offering the most potential by all the leading vendors of software and services in Europe. To a large extent, this is based on the opportunities perceived in Eastern Europe by their clients in the distribution sector. The merger with East Germany is viewed very positively, but the lack of existing infrastructure, especially in telecommunications and financial services, is seen as an obstacle to rapid growth.

The industry-specific software and services market in the German distribution sector is estimated to reach DM1.8 billion by 1991. It is forecast to grow to DM3.75 billion by 1996, a CAGR of 16%. This places it as the third largest country market in Europe (25% share), just slightly behind France and the U.K. The high growth rate is going to give it a strong lead, making it 31% of the European total by 1996. Exhibit IV-9 gives the breakdown by delivery mode. Applications solutions in the form of application products and turnkey systems are a particular strength of German vendors.

Exhibit IV-9

Distribution Sector Software and Services Market
Germany, 1991-1996

| | DM MILLIONS | | | | |
|-----------------------------------|-------------|-------|-------|-----------------------------------|-------|
| SUBSECTOR | 1990 | 1991 | 1992 | 1991 1996 CAGR (PERCENT) | 1996 |
| Processing Services | 130 | 135 | 140 | 3 | 160 |
| Turnkey Systems | 600 | 695 | 785 | 13 | 1,300 |
| Applications Software Products | 165 | 200 | 240 | 20 | 500 |
| Professional Services | 395 | 455 | 515 | 13 | 850 |
| Network Services | 105 | 130 | 165 | 26 | 420 |
| Systems Operations | 25 | 35 | 40 | 22 | 95 |
| Systems Integration | 110 | 140 | 175 | 25 | 420 |
| TOTAL (ROUNDED) | 1,550 | 1,800 | 2,050 | 16 | 3,750 |

The merger of Siemens and Nixdorf into SNI has resulted in the only European vendor able to compete on near-equal terms in its home territory, head-to-head with IBM across both retail and wholesale sectors of the distribution market. Nixdorf's long-term strategy of offering turnkey system solutions as its main line of business has given it a significant advantage over its other European rivals in terms of software and services revenues. Its adoption of open systems platforms and the gradual transfer of both its applications software products and its customers to UNIX and MS-DOS make it a good fit with Siemens. They offer a broad range of open hardware platforms and better established sales channels through and with third parties. Nixdorf has a large share of the POS market in Germany and is in the top three in most European countries. Nixdorf has a strong pedigree in distribution applications.

SAP is a software product company that is experiencing rapid international growth, has a large market share in its home country of Germany, and has a modular, IBM mainframe, SAA-conformant product line. Its main market sector is manufacturing, but it has some major retailers in its customer base, introduced further products for in-store (POS) and headquarters applications in 1991. One of the few European companies to have a clear strategy for the single European market, SAP's products support seven languages-not just in local variants of the product, but in concurrent use on the same system if necessary. They see this as an attraction for companies already employing multinational staff, each of whom can use the system in the language of choice. EDI interfaces were developed in response to their manufacturing customers and are well integrated in their product line.

In common with other software vendors, SAP has decided to widen its available market by converting its products to UNIX. This is also in response to its large customers' implementing applications on smaller platforms-either IBM midrange (AS/400) or UNIX. The re-engineered, table-driven products will maintain its SQL standards-to allow porting to different database platforms-and offer the same functionality as its mainframe products.

EFTPOS (Electronic Funds Transfer at the Point of Sale) in Germany is a long way behind other developed countries, largely due to the banks' being slow to offer terms attractive to retailers. IBM and the German PTT have established a joint venture to offer electronic cash (EC) network services. The oil companies are now moving quickly to install card payment systems at the pumps in forecourts throughout Germany.

3. United Kingdom

The retail concentration which has taken place over the last two decades in the U.K. has resulted in the retail sector's exceeding the wholesale sector by some 50%. The number of shops per head of population is the lowest in Europe, and the food sector is dominated by five large supermarket chains with over 50% market share between them. In non-food the large multiples also dominate, and the consolidation continues. Two retailers, Sainsburys and Marks and Spencer, are seen as European market leaders in their exploitation of IS. Both are noted for the quality of customer service and the size of their business profits. The U.K. generally is envied for the profits made in the distribution sector. Few wholesalers have turnovers above 100M, but those that have grown significantly seem to have made maximum use of information systems.

The industry-specific software and services market in the United Kingdom distribution sector is estimated to reach 545 million by 1991. It is forecast to grow to 795 million by 1996, a CAGR of 18%. Exhibit IV-10 gives the breakdown by delivery mode.

The U.K. leads also in the use of EDI, though this has been stimulated almost entirely by far-sighted manufacturers, rather than by demanding retailers. Component and raw material wholesalers are seeing the benefits well before the retail sector. INPUT estimates that the U.K. represented 40% of the European EDI network applications market in 1990.

Exhibit IV-10

**Distribution Sector Software and Services Market
United Kingdom, 1991-1996**

| | £ MILLIONS | | | | |
|-----------------------------------|------------|------------|------------|-----------------------------------|------------|
| SUBSECTOR | 1990 | 1991 | 1992 | 1991 1996 CAGR (PERCENT) | 1996 |
| Processing Services | 29 | 29 | 28 | -3 | 25 |
| Turnkey Systems | 141 | 152 | 160 | 6 | 205 |
| Applications Software Products | 43 | 49 | 54 | 12 | 85 |
| Professional Services | 170 | 180 | 190 | 5 | 235 |
| Network Services | 70 | 78 | 87 | 12 | 140 |
| Systems Operations | 6 | 7 | 9 | 16 | 15 |
| Systems Integration | 43 | 49 | 55 | 13 | 90 |
| TOTAL (ROUNDED) | 500 | 545 | 580 | 8 | 795 |

EFTPOS (Electronic Funds Transfer at the Point of Sale) has had a hesitant start in the U.K. While it has been up to the banks, they have never offered very attractive terms to retailers. The failed initiative by U.K. banks resulted from the need for check-out clerks to rekey totals from the POS terminal to the EFTPOS terminal. In the past year, a new service, initially taken up by Sainsburys, allows direct integration of an EFTPOS service into the in-store POS systems. This results in savings in cheque and cash handling for both retailers and banks, and a transaction charge of 1.7% of turnover.

ICL has taken the initiative in the U.K.'s retail sector for in-store and point of sale products and systems. Now representing over an eighth of ICL's business revenues worldwide, this business is still expanding rapidly across Europe. Working in close partnership with some of the U.K.'s leading retailers to address the key business issues with the latest technology, ICL has become the market leader in scanning (electronic point of sale) systems. Many of its EPOS software and service offerings have been developed in-house, contributing in higher than usual proportions to its total revenues.

ICL is well positioned to extend its offerings out to the back of the store and along the supply chain. EPOS-led information systems are becoming the next natural step for retailers, and ICL already has a strong community of interest among distributors through its EDI (Tradernet) activities. It is already actively seeking partners for such diversification.

4. Italy

The Italian market is dominated by small traditional companies. There are more retail shops per person than in any other European country. However, the French hypermarket chains are being highly successful in building business in Italy, where development is said to be three years behind that in France. Several joint ventures are in place with foreign distribution companies, including some Japanese companies.

Government regulations impose severe restrictions on the design of POS systems. These are based on requirements for a seven-year audit trail of sales totals, number of tickets and tax totals. Approval procedures can delay new products for long periods. The predominance of small businesses means that most attention is given to small POS systems. This is the area where Olivetti shines, though it faces strong competition from Casio and TEC.

The industry-specific software and services market in the Italian distribution sector is estimated to reach Lira 540 billion by 1991. It is forecast to grow to L975 billion by 1996, a CAGR of 13%. Exhibit IV-11 gives the breakdown by delivery mode.

It is only in the larger companies that such topics as systems integration, EDI and industry standards are a priority. La Rinascente, the second-largest Italian retail group (after the Italian Co-op), controls seven totally different retail chains. Their corporate IS strategy is to allow them all to make their own IS decisions but remain compatible across the group for networking and information consolidation purposes. For example, the company has adopted UNIX as a standard; this allows each subsidiary a broader choice from which to select its own suppliers.

One-to-one connections are generally used for communication between trading companies, with networks used only for internal data transmission. The advent of EDI standards will be a major step forward in reducing communication difficulties and improving information flow. EDIFACT has emerged as the standard of choice for EDI in Italy and will be one of the key areas for user investment over the next few years. INPUT estimates that Italy represented 12% of the European EDI network applications market in 1990.

Exhibit IV-11

Distribution Sector Software and Services Market
Italy, 1991-1996

| | LIRA BILLIONS | | | | |
|-----------------------------------|---------------|------------|------------|-----------------------------------|------------|
| SUBSECTOR | 1990 | 1991 | 1992 | 1991 1996 CAGR (PERCENT) | 1996 |
| Processing Services | 44 | 45 | 43 | -2 | 40 |
| Turnkey Systems | 75 | 85 | 95 | 10 | 140 |
| Applications Software Products | 79 | 97 | 110 | 18 | 220 |
| Professional Services | 195 | 230 | 250 | 12 | 400 |
| Network Services | 46 | 54 | 60 | 14 | 105 |
| Systems Operations | 11 | 13 | 15 | 18 | 30 |
| Systems Integration | 14 | 17 | 20 | 19 | 40 |
| TOTAL (ROUNDED) | 465 | 540 | 595 | 13 | 975 |

5. Rest of Europe

Spain is seen by all major vendors as the most promising country market in the West European distribution sector in terms of growth potential. Distribution sector user expenditure on industry-specific software and services is estimated to reach Pta 13 billion in 1991, growing to Pta 27 billion by 1996, a CAGR of 16%.

The geography of Spain presents a very fragmented market for distribution companies. There are three areas with a solid infrastructure supporting strong growth for the distribution business in Madrid, Barcelona and Alicanti. There are only a small number of substantial retail and wholesale companies (around 100) providing a potential market for large integrated systems. The main activity will continue to be centred on PCs and POS cash registers, installed to speed customers through check-outs and to maintain records of sales and receipts. In the rural areas, small shops fed by cash and carry warehouses will remain the norm. In developed areas, hypermarkets and department stores are investing in information systems and services. Expo 92 is expected to put a firm distribution infrastructure in place in southern Spain.

The attractive growth prospects in Spain have resulted in investment-for example, Arthur Andersen and Price Waterhouse investing in software companies Coritel and Tectel. Equipment vendors are also seeking software partners to develop their local software and service capability, though the market leaders already have well-established channels and software product partners.

The industry-specific software and services market in the rest of Europe in the distribution sector is estimated to reach \$360 million by 1991. It is forecast to grow to \$540 million by 1996, a CAGR of 9%.

Of the countries outside the European community, Sweden is seen as the most active in positioning itself to benefit from the trading growth expected when the barriers finally fall. To this end it is investing heavily in member countries to ensure that it doesn't become excluded from the Single European Market, even if it is not an official member itself. Whatever the result of that initiative, it is generally presumed that member countries will benefit more from increased trade than will nonmember countries-hence, a growth rate for software and services which seems to contradict the fact that both Scandinavia and Switzerland are near the European forefront in using advanced information systems for their distribution businesses.

Appendices

A Forecast Database Distribution Sector Industry Specific Software & Services, Western Europe 1991-1996

Exhibit A-1

User Expenditure on Distribution Software and Services by Major Region Western Europe, 1991-1996

| Country | \$ Exch Rates | Curr' | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1991- 1996 CAGR Percent |
|-----------------|---------------------|--------|-------|-------|-------|-------|-------|-------|----------------------------------|
| France | 5.65 | FF M | 6.00 | 6.50 | 7.20 | 8.00 | 8.80 | 9.80 | 10 |
| Germany | 1.68 | DM M | 1.80 | 2.05 | 2.40 | 2.80 | 3.20 | 3.75 | 16 |
| United Kingdom | 0.52 | M | 0.55 | 0.58 | 0.63 | 0.68 | 0.74 | 0.80 | 8 |
| Italy | 1.23 | Lira B | 0.54 | 0.59 | 0.66 | 0.75 | 0.86 | 0.97 | 12 |
| Spain | 95.00 | Ptas M | 13.00 | 15.00 | 17.00 | 20.00 | 23.00 | 27.00 | 16 |
| Rest of Europe | 1.00 | \$ M | 0.36 | 0.38 | 0.41 | 0.45 | 0.50 | 0.54 | 8 |
| Total (Rounded) | 1 | \$ M | 4.2 | 4.6 | 5.2 | 5.8 | 6.4 | 7.2 | 11 |

Note. Only products and services specific to the European insurance industry sector are included in these forecasts. Cross-industry delivery modes are not included.

Exhibit A-2

Distribution Sector
User Expenditure by Delivery Mode
Western Europe, 1990-1996

| | \$ Millions | | | | | | | | |
|-------------------------------------|-------------|------------------------------------|-------|-------|-------|-------|-------|-------|----------------------------------|
| Industry Specific Delivery Modes | 1990 | 1990- 1991 Growth Percent | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1991- 1996 CAGR Percent |
| Total (Rounded) | 3,650 | 12 | 4,100 | 4,500 | 5,100 | 5,700 | 6,300 | 7,100 | 12 |
| Processing Services | 310 | 0 | 310 | 300 | 300 | 300 | 300 | 300 | -1 |
| Turnkey Systems | 1,100 | 12 | 1,230 | 1,330 | 1,470 | 1,620 | 1,780 | 1,960 | 10 |
| Application S/W | 430 | 16 | 500 | 580 | 670 | 790 | 910 | 1,070 | 16 |
| - Mainframe | 50 | 0 | 50 | 50 | 50 | 50 | 50 | 50 | 0 |
| - Minicomputer | 150 | 13 | 170 | 190 | 210 | 230 | 260 | 290 | 11 |
| - Workstation/PC | 230 | 26 | 290 | 350 | 420 | 510 | 610 | 730 | 20 |
| Systems Operations | 60 | 17 | 70 | 80 | 90 | 110 | 130 | 150 | 16 |
| Systems Integration | 230 | 17 | 270 | 320 | 390 | 460 | 550 | 650 | 19 |
| Professional Svcs | 1,200 | 12 | 1,340 | 1,450 | 1,590 | 1,750 | 1,910 | 2,110 | 10 |
| - IS Consultancy | 180 | 6 | 190 | 210 | 230 | 250 | 280 | 310 | 10 |
| - Ed & Training | 160 | 6 | 170 | 180 | 200 | 210 | 230 | 250 | 8 |
| - Custom Software | 860 | 14 | 980 | 1,060 | 1,170 | 1,290 | 1,410 | 1,550 | 10 |
| Network Services | 340 | 18 | 400 | 460 | 540 | 640 | 750 | 890 | 17 |

B Forecast Reconciliation, 1990-1995**Exhibit B-1**

Distribution Sector Software and Services
Reconciliation of Market Forecast, Western Europe

| | 1990 Market | | | 1995 Market | | | 1990-1995 | | |
|---------------------|-------------------------|-------------------------|-----------------------|-------------------------|-------------------------|-----------------------|---------------------------|---------------------------|----------|
| | 1990 Report (\$M) | 1991 Report (\$M) | Variance (Percent) | 1990 Report (\$M) | 1991 Report (\$M) | Variance (Percent) | 1990 CAGR (Percent) | 1991 CAGR (Percent) | Variance |
| Total for Sector | 3,190 | 3,650 | + 14 | 6,990 | 6300 | -10 | 17 | 12 | -5 |
| Processing Services | 275 | 310 | + 13 | 345 | 300 | -13 | 5 | -1 | -6 |
| Turnkey Systems | 1,150 | 1,100 | -4 | 2,100 | 1,780 | -15 | 16 | 10 | -6 |
| Application S/W | 370 | 430 | + 16 | 840 | 910 | + 8 | 22 | 16 | -6 |
| Professional Svcs | 880 | 1,200 | + 36 | 1,790 | 1,910 | + 7 | 15 | 10 | -5 |
| Network Services | 305 | 340 | + 11 | 840 | 750 | -11 | 22 | 17 | -5 |
| Systems Operations | 24 | 60 | + 250 | 54 | 130 | + 240 | 18 | 16 | -2 |
| Systems Integration | 200 | 230 | + 15 | 595 | 550 | -8 | 25 | 19 | -6 |

The change in the size of the market in the base year of 1990 is very largely accounted for by changes in the dollar exchange rates in Europe. All currencies rose significantly against the dollar. This accounts for 15% of the increase.

The growth rate predictions have fallen as a result of a general fall in inflation rates and the overall negative effect of economic recession. In addition the acceleration of the trend to downsize is hitting the mainframe market to the benefit of the countertop (desktop) and small servers.

Systems Operations is only a small element of the overall market but has been reassessed to a new base year figure of \$60M for 1990.

It is considered very unlikely that the sector will see a return to the high growth rates of the last few years. However as recession eases it is predicted that user spending levels will begin to rise faster than they are today.

C Glossary of EDI Terms

| | |
|---------------|--|
| ABI | Automated Broker Interface. |
| ACH | Automated Clearing-house. |
| ACP 90 | Air Cargo Processing in the Nineties. |
| AECMA | Association Europeene des Constructeurs de Matriel Aerospatiale |
| AGHA | Antwerp Port Community |
| ANA | Article Numbering Association |
| ANSI | American National Standards Institute |
| APACS | Association of Payment and Clearing Services |
| ASTI | Association des Services Transports Informatiques |
| ATM | Automatic Teller Machine |
| BACS | Bankers Automated Clearing Service |
| BDI | Batch Data Interchange |
| BEDIS | Booktrade Electronic Data Interchange Standards |
| CAD/CAM | Computer Aided Design/Computer Aided Manufacturing |
| CADDIA | Cooperation in the Automation of Data and Documentation for Imports/Exports in Agriculture |
| CALS | Computer-Aided Acquisition and Logistics System |
| CASE | Common Application Service Elements |
| CCITT | Comit Consultatif International Tlgraphique et Tlphonique |
| CCS | Cargo Community System |
| CEFIC | Conseil Europeen des Fdrations de l'Industrie Chimique |
| CEPT | Committee of European Postal and Telecommunications Administrations |
| COMPRO | General term for European boards concerned with simplification of commercial procedures |
| DEUPRO | The German COMPRO |
| DIN | Deutsches Institut Fur Normung |
| DISH | Data Interchange for Shipping |
| EAN | International Article Numbering Association |
| EBDI | Electronic Business Data Interchange |
| ECU | European Currency Unit |
| EDI | Electronic Data Interchange |
| EDIA | Electronic Data Interchange Association |
| EDICON | Electronic Data Interchange in Construction (UK) |
| EDI Construct | Electronic Data Interchange in Construction (France) |
| EDIFACT | Electronic Data Interchange for Administration, Commerce and Transport |
| EDIFICE | Electronic Data Interchange Forum for Companies Interested in Computing and Electronics |
| EDIMS | Electronic Data Interchange Messaging System |
| EFT | Electronic Funds Transfer |
| EFTPOS | Electronic Funds Transfer at Point of Sale |
| EP | Electronic Publishing |
| EPOS | Electronic Point of Sale |
| ERTIS | European Raod Transport Information Services |
| ETDI | Electronic Trade Data Interchange |

| | |
|------------|---|
| FTAM | File Transfer Access and Management |
| IGES | International Graphics Exchange Specification |
| IATA | International Air Transport Association |
| ICARUS | Irish Community Aircargo Realtime User System |
| INTIS | International Transport Information System |
| JEDI | Joint Electronic Data Interchange |
| JIT | Just-in-Time |
| LACES | London Airport Cargo EDP System |
| LDI | Logistics Data Interchange |
| MARC | Machine Readable Cataloguing (of books) |
| MDN | Managed Data Network |
| MDNS | Managed Data Network Service |
| MCP | Maritime Cargo Processing |
| MOTIS | Message Orientated Text Interchange System |
| NAPLP | North American Presentation Layer Protocol |
| ODETTE | Organisation for Data Exchange by Teletransmission in Europe |
| OFTTEL | Office of Telecommunications (UK) |
| OFTP | Odette File Transfer Protocol |
| PACE | Ports Automated Cargo Environment |
| PDN | Public Data Network |
| PIDX | Petroleum Industry Data Exchange |
| PSS | Packet Switch Service |
| PSTN | Public Switched Telephone Network |
| PTO | Public Telecommunications Operator |
| PTT | Postal, Telegraph and Telephone Administration |
| PVS | Private Videotex System |
| RINET | Reinsurance and Insurance Network |
| SEAGHA | Systems Electronic and Adapted Data Interchange in the Port of Antwerp (see AGHA) |
| SITA | Society of International Airline Telecommunications |
| SITPRO | Simplification of International Trade Procedures Board |
| SITPRONETH | Netherlands body for the Simplification of Trade Procedures (Dutch COMPRO) |
| SMMT | Society of Motor Manufacturers and Traders |
| SOFI | Système d'Ordinateurs pour le traitement de Fret International |
| SWIFT | Society for World Interbank Financial, Telecommunications |
| TDCC | Transportation Data Coordinating Committee |
| TDI | Trade Data Interchange |
| TDC | Trade Data Convention |
| TEDIS | Trade Electronic Data Interchange Systems programme |
| TISSG | Travel Industry System Standards Group |
| TRADACOMS | Trading Data Communications Standard |
| TRADANET | The EDI service of INS |
| TRANSCOM | EDI project of the Dutch article number association (retail sector) |
| TRANSNET | GEIS EDI application based on EDIFACT |
| TS | Transaction Services |
| TUA | Telecommunications Users Association |

| | |
|---------|--|
| UAC | Stichting Uniforme Artikel Codering (Dutch retail trade association) |
| UNECE | United Nations Economic Commission for Europe |
| UNGTDI | United Nations Guide-lines for Trade Data Interchange |
| UNICORN | United Nations Interactive (message) Concept Over Reservation Networks |
| UNJEDI | United Nations |
| UNTDDE | United Nations Trade Data Elements Directory |
| UNTDI | United Nations Trade Data Interchange |
| VADS | Value Added and Data Services |
| VANS | Value Added Network Services |
| VDA | German Automotive Trade Associations |
| X12 | Generic EDI standards approved by the American Standards Committee |
| X.25 | International standard formulated by CCITT for assembling and transmitting data in a packet switched network |
| X.400 | International electronic messaging standard recommended by the CCITT |

